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Mazdoor Kisan Shakti Sangathan

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IS 8916 (1978): Spherometer [PGD 22: Educational Instruments and Equipment]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS: 8916 - 1978

Indian Standard
SPECIFICATION FOR
SPHEROMETER

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SPECIFICATION FOR SPHEROMETER

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SPECIFICATION FOR SPHEROMETER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 26 September 1978, after the draft finalized by the Educational Instruments and Equipment Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Spherometer is generally used for measuring the thickness of thin plates and for determining the radii of curvature of spherical (concave and convex) surfaces, such as lenses or mirrors. It works on the principle of a micrometer screw. The nomenclature of the various parts of spherometer is shown in Fig. 1.

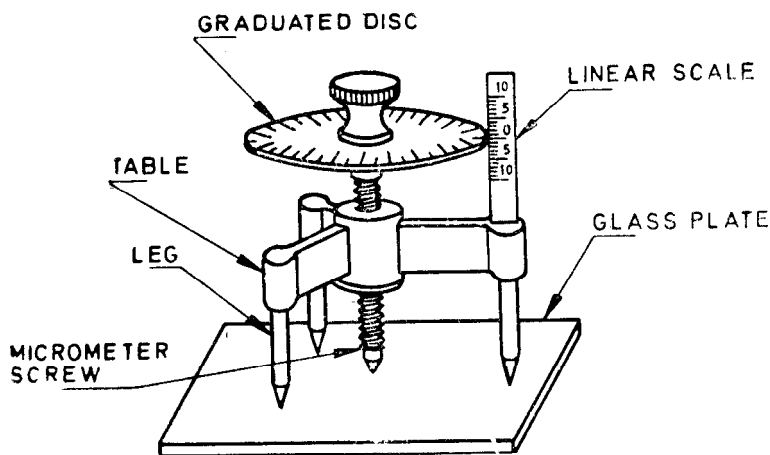


FIG. 1 NOMENCLATURE FOR SPHEROMETER

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard covers the general and functional requirements and tests of spherometer.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Back Lash — It is the lack of motion or lost motion of the screw when its direction of rotation is changed.

2.2 Graduated Disc — It is a circular scale attached to the head of the screw.

2.3 Least Count — It is the value of one division on the circular scale which can be correctly read with the help of the spherometer.

2.4 Legs — Three in number, the bottom points of which are in one plane and the lines joining them form an equilateral triangle.

2.5 Micrometer Screw — An accurately cut screw terminating at the top into a milled head. This forms the fourth leg of the spherometer.

2.6 Pitch — It is the distance between corresponding points on adjacent threads of the screw measured parallel to the axis in the same axial plane.

2.7 Scale — The vertical linear scale fixed normal to the plane of the table. The position of the screw can be read by means of this scale.

2.8 Table — A frame-work supported by the three legs, the centre of which has a threaded hole for the movement of the micrometer screw.

3. MATERIAL

3.1 The material of the various part shall be as under:

<i>Component</i>	<i>Material</i>
Graduated disc	Brass, aluminium
Legs	Mild steel with hardened tip or stainless steel
Scale	Stainless steel, brass or aluminium
Screw	Stainless steel or high grade tool steel
Table	Brass or aluminium

4. GENERAL REQUIREMENTS

4.1 The minimum length and diameter of leg shall be 25 mm and 4 mm respectively. Legs shall be 40 mm apart from each other.

4.2 The measuring range of scale shall be 20 mm with zero in the middle, +10 mm at the top and -10 mm at the bottom.

4.3 The graduated disc shall be divided into 100 equal divisions with numbering at every tenth division.

4.4 The pitch of the screw shall be $\frac{1}{2}$ mm or 1 mm.

5. FUNCTIONAL REQUIREMENTS

5.1 The ends of the three legs shall have sharp points and shall be made in a manner that the points are co-planar and form an equilateral triangle.

5.2 The screw shall be cut accurately and shall work smoothly through the threaded hole at the centre of the table, without jerks or backlash, throughout the length of its travel.

5.3 The legs shall be tightly fitted on the table.

5.4 The screw and the threaded portion of the table shall be so cut that the graduated disc moves up and down along the scale truly vertically and in a manner that the edge of the graduated disc moves just along the vertical scale but without actually touching the same. The scale and the graduated disc shall be bevelled at the periphery.

6. TESTS

6.1 The distances between the lower points of the three legs shall be equal to each other to within 0.5 mm.

6.2 The distances from the three legs to the central screw shall be equal to each other to within 0.5 mm.

6.3 When the three legs and the screw are resting on a flat surface without rocking, the upper plane of the circular scale shall be parallel to the flat surface to within 0.5 mm and the zero error shall not exceed the least count value.

6.4 When the three legs are resting on a flat surface, the central screw and the vertical linear scale shall be square to the flat surface to within 2 mm. The squareness shall be checked throughout the range of movement of the screw.

6.5 The linear and circular scales shall be accurate to within the least count value.

7. FINISH

7.1 All parts made of mild steel or aluminium shall be properly coated or plated to prevent corrosion. The screw shall be provided with a thin light non-corrosive oil at its place of movement in the threads.

8. MARKING

8.1 Each spherometer shall be legibly marked with the name or trade-mark of the manufacturer, its serial number and month and year of manufacture.

8.1.1 The spherometer may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. PACKING

9.1 Each spherometer shall be packed in a suitable protective case.

9.2 A separate 5 mm thick glass plate (100 × 100 mm) with its edges properly ground shall be provided with the spherometer.